SANDIA NATIONAL LABORATORIES

LOCATION(S)	Albuquerque, NM | Livermore, CA | Tonopah Test Range, NV | Kaui Test Facility, HI
WEB SITE	http://www.sandia.gov
CONTRACT OPERATOR	Sandia Corporation
CONTRACT DATES	October 1, 1993 – April 30, 2017
LABORATORY DIRECTOR	Jill Hruby
FIELD OFFICE MANAGER	Jeff Harrell

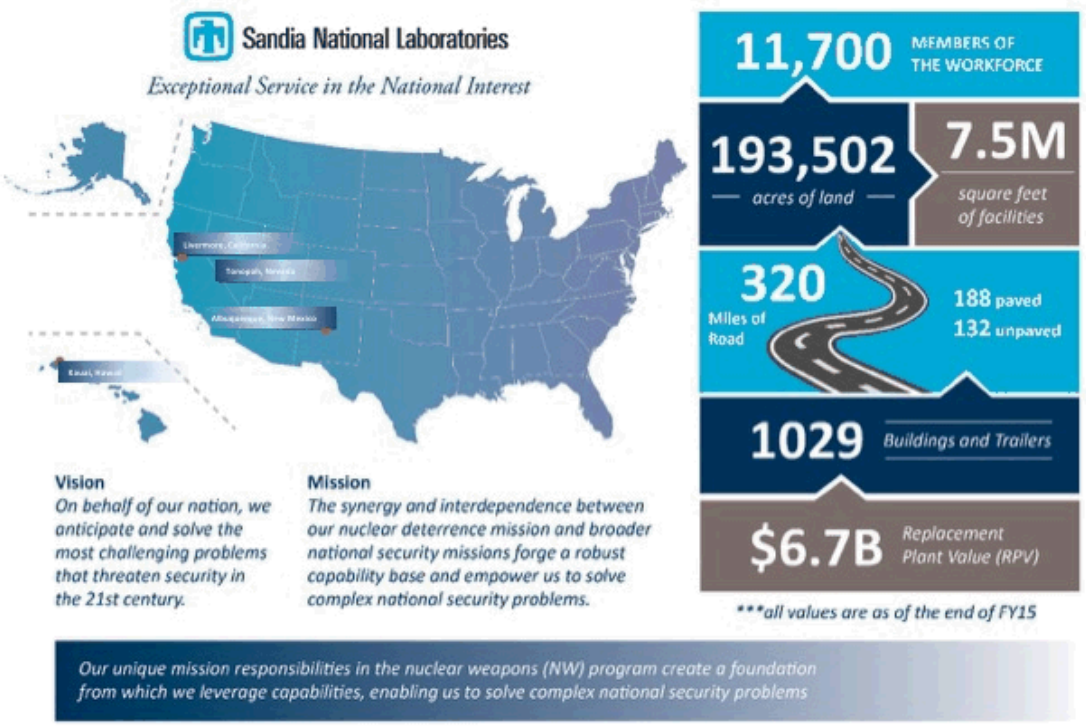
Three key components make up the core of the SNL's infrastructure: people, facilities, and equipment.

PEOPLE	**Staff Members**	10,539
	Average Years of Employment	12.5
	Average Age of Employees	46.2
FACILITIES	**Number of Assets**	1,216
	Gross Square Footage	7,349,397
	Replacement Plant Value	$6,515.5M
	Deferred Maintenance	$391.3M
EQUIPMENT	**Pieces of Equipment**	
	Equipment Replacement Value	
	Equipment Replacement Backlog	

Table 1. Facilities data current as of FY15 year-end. Source: FIMS

**Only FTEs used in this data.*

Site Leadership's Vision



Sandia operates four sites situated in New Mexico (SNL/NM), California (SNL/CA), Nevada (TTR), and Hawaii (KTF).

Evolving Missions. Sandia has been a Federally Funded Research and Development Center (FFRDC) for nearly seven decades. Throughout its history, Sandia has seen its missions evolve. Post 9/11, Sandia expanded its national security role. During the past ten years, evolving national security challenges have resulted in mission expansion focused on:

- Nuclear Weapons (NW) Life Extension Programs
- Research, technology development, cyber, bio, and space programs associated with:
  - Maintaining U.S. defense technological superiority through leveraged innovations
  - Reducing global chemical and biological dangers
  - Ensuring a Secure & Sustainable Energy Future

Significance of **Facilities & Infrastructure (F&I).** The future success of Sandia's mission delivery depends on its ability to timely update, recondition, and repair key laboratories, buildings, test sites, and high-security facilities. If not addressed, then Sandia's aging infrastructure could limit the Labs' contribution to national security by failing to support program requirements over the next 25 years. In close collaboration with DOE and NNSA, Sandia needs to have facilities, infrastructure, and capabilities in a mission-ready state. However, the time is soon coming when Sandia's efforts will be limited by the condition of its infrastructure. Investments in line item and non-line item construction are currently needed to meet future mission deliverables as current real property assets are being consumed at an accelerated rate due to current mission assignments. Sandia's real property assets are large and complex, resulting in major challenges to improve overall condition.

Recapitalization Over the decades, Sandia has evolved from a NW laboratory to a multi-mission national security laboratory by expanding its NW expertise into other areas, which in-turn benefited NW. However, a multi-mission laboratory, SNL lacks multi-mission sponsored facilities and infrastructure (F&I) processes and funding to recapitalize its facilities and infrastructure. This creates added complexity in attempting to find adequate funding to sustain and improve current F&I or acquire new real property assets. A declining F&I funding base, combined with a trend toward greater reliance on indirect funding to recapitalize its sites, and a total cost of programmatic F&I needs that far exceeds available funding, all contribute to the challenge to keep its real property assets in a condition to enable current and future missions.

Sandia Infrastructure at a Glance

Average age of facilities:	37 years
Acres of land:	193,500
Gross Square Footage:	7.4 million
Miles of paved road:	188
# of assets:	1,216
Deferred maintenance:	$391.3 million
Total repair needs:	$656 million
Replacement plant value:	$6,515.5 million

NOTE: All figures are rounded

Recapitalization needs have been estimated at $168M/year more than what is currently spent. F&I investment plans for the next five years do not contain funding for major recapitalization projects. The longer recapitalization is delayed, the greater the cost in future years to bring F&I conditions to acceptable levels. Sandia is also pursuing alternatives to the traditional funding methods.

Major acquisitions of new facilities and major renovations rely heavily upon the line item process which is both uncertain and lengthy. In the future, processes and requirements will make imperative the need for agility and flexibility in the funding and design of facilities that provide mission enabling support. Sandia's Leadership has identified the following as its most critical line item facilities needs:

1) Trusted Microsystems Capability (TMC)
2) Component Engineering Facility (replaces 892 & 894)
3) Mission Support Science and Technology Laboratory (MSSTL)
4) Research Reactor Facility (RRF)
5) Z-Next, contingent one national pulsed-power initiative
6) TTR Infrastructure
7) EORC (In progress)
8) TA-IV S Chilled Water Loop (In progress)

Deferred Maintenance (DM) – the practice of postponing maintenance activities to save costs, meet budget funding levels, or redirect funds is a daunting issue across all NNSA facilities, including Sandia. Sandia's average age of facilities is 38 years. Some buildings are older than 60 years of age. Internal examinations have found lower F&I investment as a percentage of Replacement Plant Value (RPV) at SNL than industry standards and the NA-50 PMP. This environment results in a long-term inability to substantially buy down DM. For Sandia, DM at FY15 year-end was calculated to be $663M with total estimated repair needs of $656 million. A recalculation of DM according to a revised methodology will decrease the DM, but repair needs will remain at the current estimated level. Anticipated higher Labs funding levels beginning in FY2017 provided Labs leadership with an opportunity to redirect money toward infrastructure improvement that would reduce DM projects while keeping research project budgets stable.

For fiscal years 2017 and 2018, Sandia will reduce its Laboratory Directed Research and Development program rate – the percentage of the overall Labs' budget that can be used to fund discretionary research and development – from 5.9 percent to 5.3 percent. The lower rate, combined with planned reduced spending on program management projects and other Mission Support initiatives, will funnel about $40 million toward Sandia DM in each of the next two fiscal years, tempering its growth. The leadership's decision to direct funds toward maintenance and repair projects is a proactive move to reduce the risk of mission-delivery failure. Long-term reduction of DM remains a challenge. Purposeful Congressional and complex-wide actions like disposing of unneeded facilities and improving infrastructure management will be needed to reduce DM.

Near-Term F&I Investments. Performance results associated with the current level of investments in Sandia's F&I for the next five years is summarized below.

- Maintenance and repair activities at planned funding levels
  - Stabilization of and some reduction in DM for FY17-18 with DM Special Emphasis Program
  - Continuation of declining condition levels through 2021

- Basic recapitalization of infrastructure & viable building assets
  - Increased space utilization
  - Use of indirect funding for DM and general-purpose projects
  - Continued exploration of NNSA & third party funding sources for recapitalization

- Nominal acquisition of new space, balanced with disposition will result in:
  - Compliance with "Reduce the Footprint"
  - Leasing with an "exit strategy"
  - Focused prioritization of major construction, including demolition, for FY2019 and beyond

- Limited disposition of excess assets
  - Current focus: Tonopah Test Range (TTR), Kauai Test Facility (KTF), sheds, and mobile offices
  - Limited activity beyond FY2018 due to continued high levels of space utilization

In short, additional funding support along with indirect funding and General Plant Project (GPP) investments are required to support SNL's growing needs and aging infrastructure. Line item investments must play a major role in supporting the Capabilities.

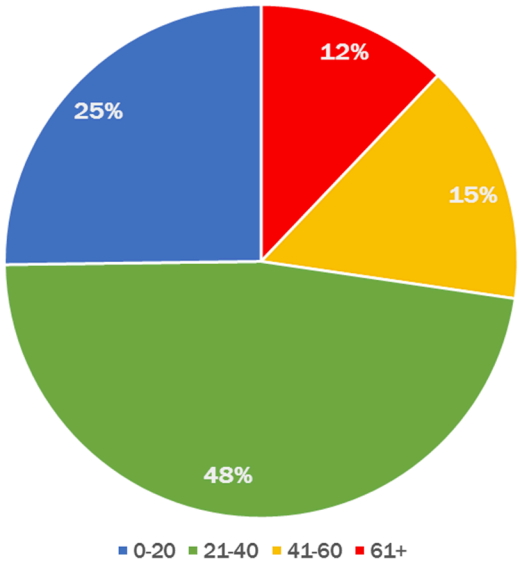
The Path Forward. Sandia's *Facilities & Infrastructure Investment Plan* includes the following:

- An acknowledgment of the need to continue to pursue line item funding from both Defense Programs and other funding sources for major capital investments;
- A focus on recapitalization, modification, and limited new construction;
- Emphasis on completing projects already underway or in the pipeline;
- Continued examination of alternative facilities acquisition approaches from non-NNSA and public-private partnership sources;
- A drive towards a reduced overall development footprint and greater space utilization through elimination of excess facilities and innovative workplace design and configuration;

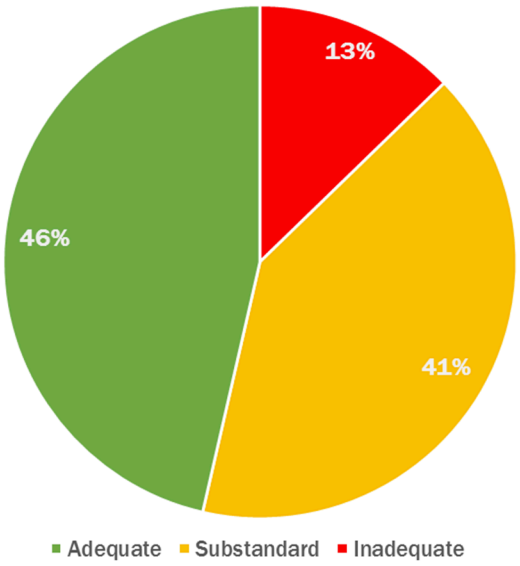
- A recognition that current DOE land holdings will not increase, so that wise use of land in the future is important;
- A recognition that a significant amount of the current portfolio of F&I assets will continue to represent high DM and M&O liabilities; and
- A recognition that the structure, availability and regulatory requirements associated with NNSA capital funds will continue to encourage construction of small buildings and use of mobile offices rather than construction of more cost-efficient, larger scale permanent structures.

Condition

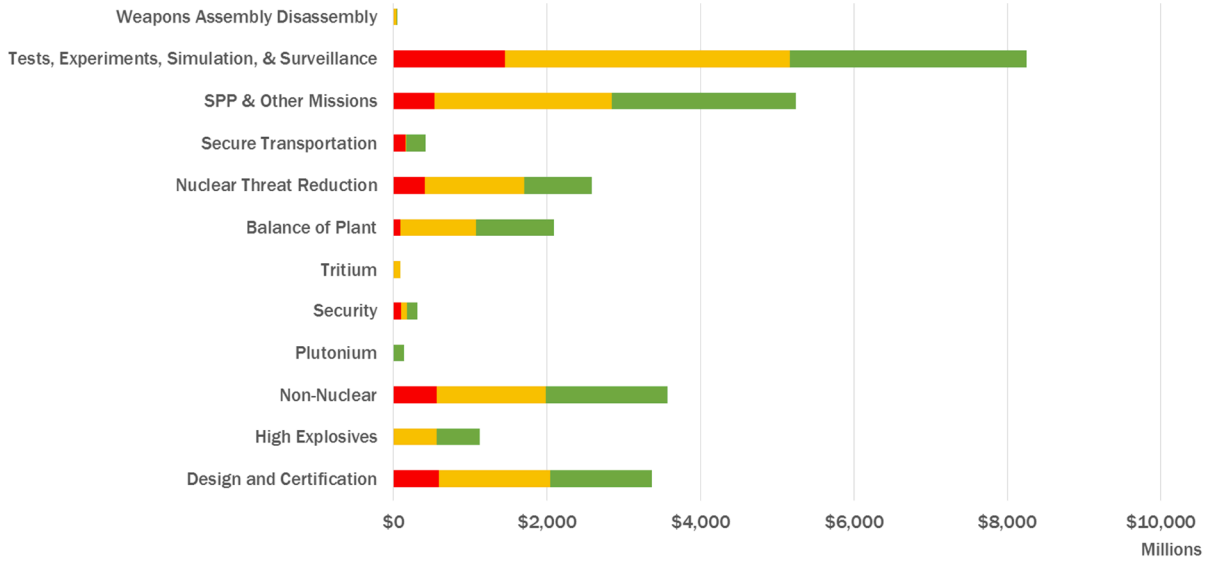
Age of All Operating Assets by RPV



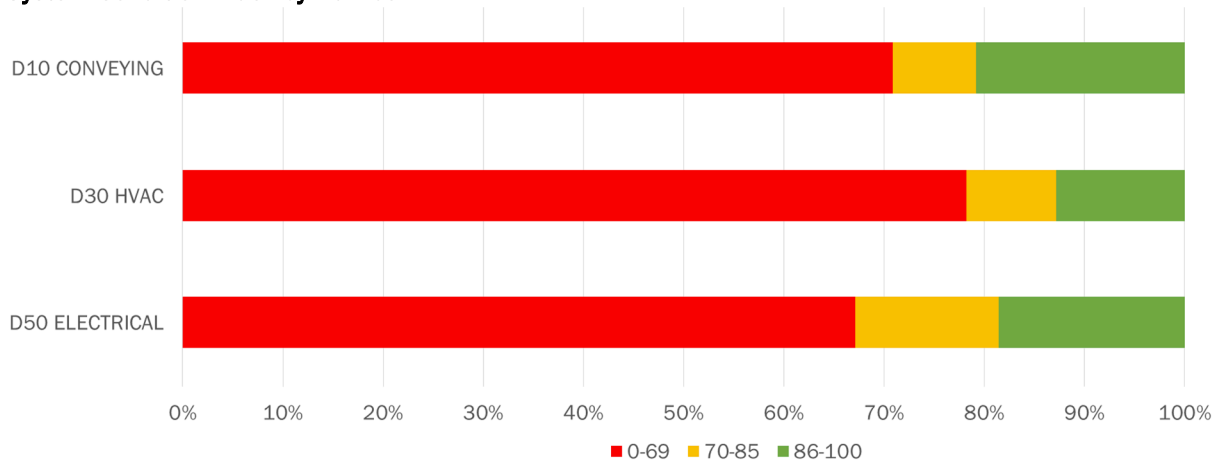
LOB Condition of Operating Assets by RPV



Key Capability LOB Condition of Operating Assets by RPV

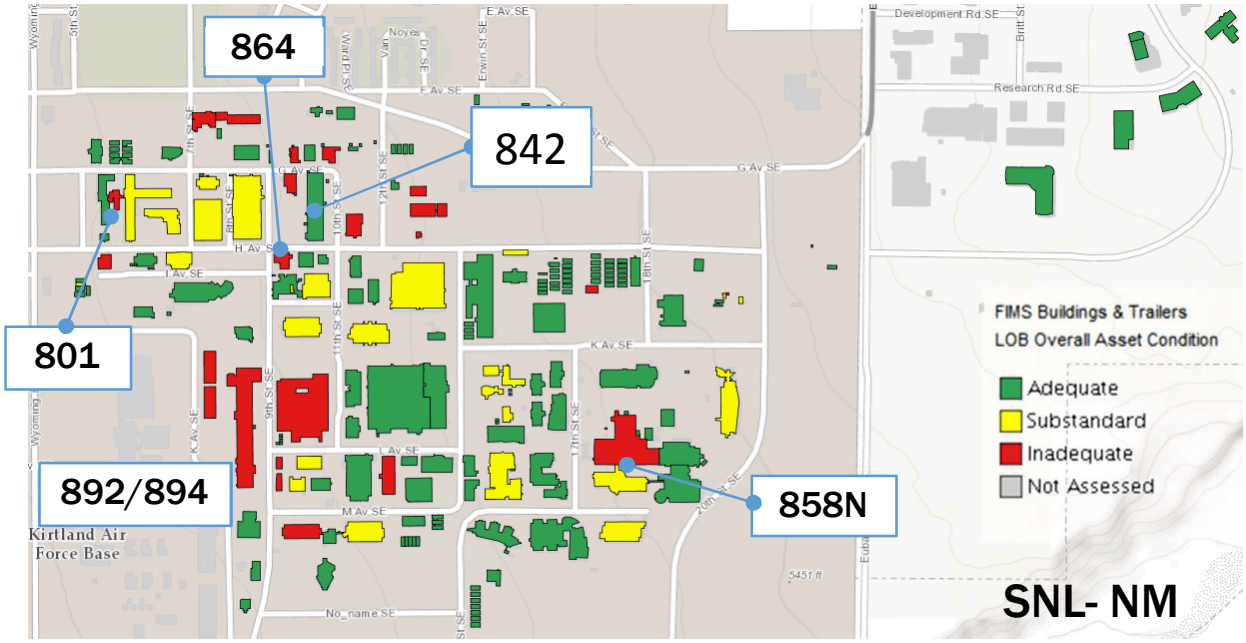


System Condition Index by Number

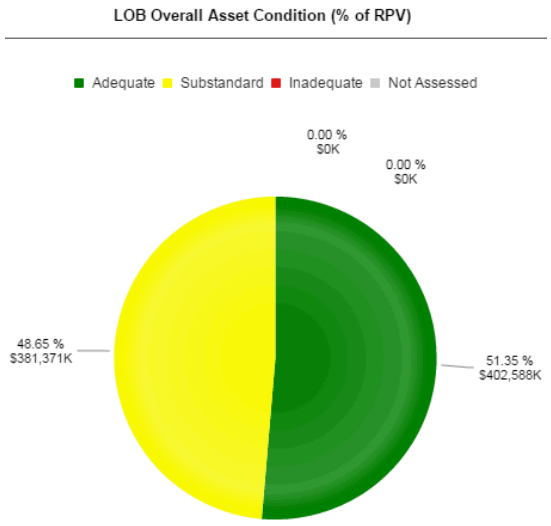


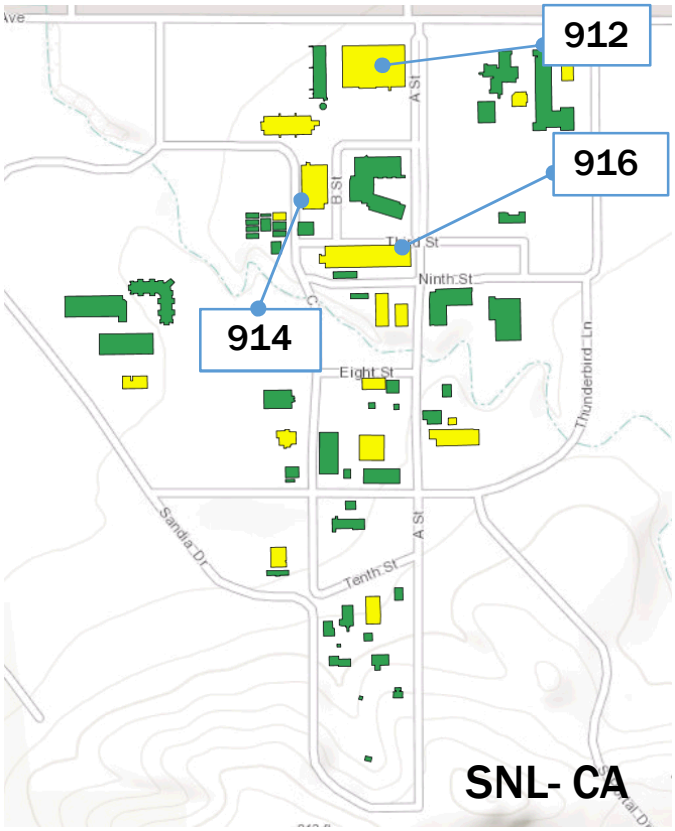
Note: Of the systems shown in this graphic, only three represent relatively complete SNL data for all assets: D10 Conveying, D30 HVAC, and D50 Electrical. The remaining system condition indexes are based on incomplete data and in many cases only reference one building. These systems are representative of BUILDER's capability to graphically depict system condition index at a site level but do not represent SNL system condition and should not be used for any planning, operations, or maintenance decisions.

Sandia has seen significant growth within the Nuclear Weapons program since 2012. The budget has recently reached $3B, and the employee population housed on-site has increased by twelve hundred. With the increase in personnel and workload, space utilization is being maximized and buildings are being run at peak loads to support the research, development, and testing activities. There is a rising concern that consuming the buildings' capabilities at a higher rate than our investment profile can support.



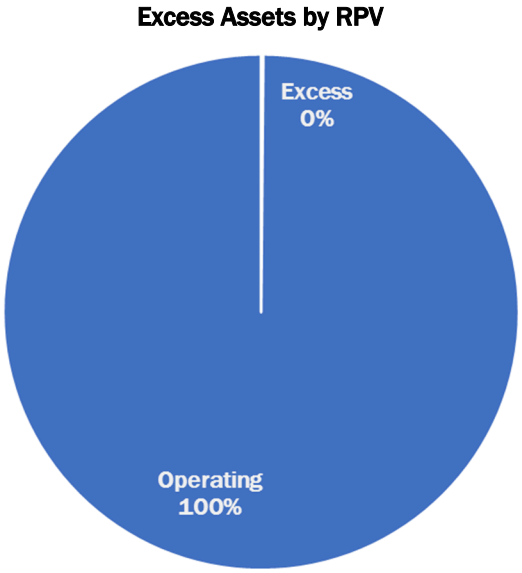
A majority of the population at SNL/NM is located within what is referred to as Technical Area I (TA-I shown above). This results in a majority of facilities supporting multiple missions & various space types. The buildings in inadequate condition support a mix of NW program, Mission Support, and Strategic Partnership Project (SPP). The NW program buildings include 892, 894, 858N, and 864. The Mission Support buildings include 801, Emergency Operations, and the Medical facilities (not called out on map). The SPP buildings include 842 and MOs 324 and 325 (not called out on map).

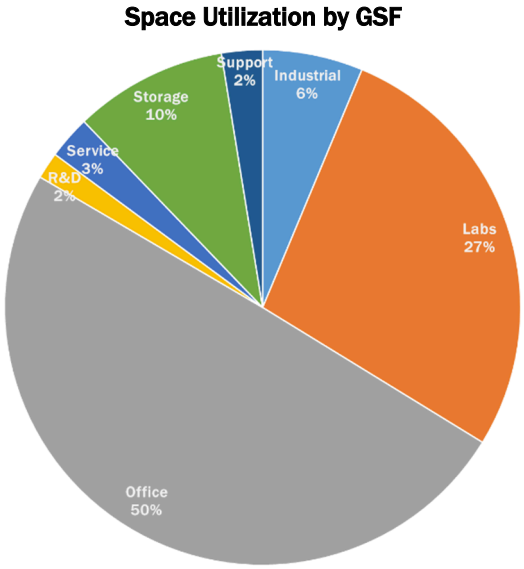




Buildings of concern for SNL/CA include C912, a major office building needing renovation to upgrade building systems and increase occupancy for anticipated program growth. The other major concern is building C916, built as a warehouse and converted to lab and office space. Similar to building 894 at SNL/NM, C914 is carrying increased mission risk, due to its substandard condition. Building C914, a laboratory and high-bay building, will see an increased workload with mission growth at SNL/CA, however, there is major concern of its structural integrity in a seismic event.

Footprint Management





The majority space type for Sandia's four sites is office; however, this is misleading. With the advances in computing simulation technology, much more research can be achieved in an office setting. Many buildings built for office functions do not have adequate cooling for the increased computing loads. Three dimensional printing is already having an impact on space utilization and is driving a need for a different space type.

FY16	Ownership	#	GSF	RPV	DM
Building	DOE Owned	709	6,432,500	$4,583.7M	$314.2M
	Leased/Permitted	111	570,914	$111.2M	$0
OSF	DOE Owned	204	-	$1,685.6M	$66.9M
	Leased/Permitted	4	-	$0.1M	$0
Trailer	DOE Owned	186	343,103	$133.5M	$10.2M
	Leased/Permitted	2	2,880	$1.4M	$0
Grand Total		**1,216**	**7,349,397**	**$6,515.5M**	**$391.3M**

Change in Square Footage

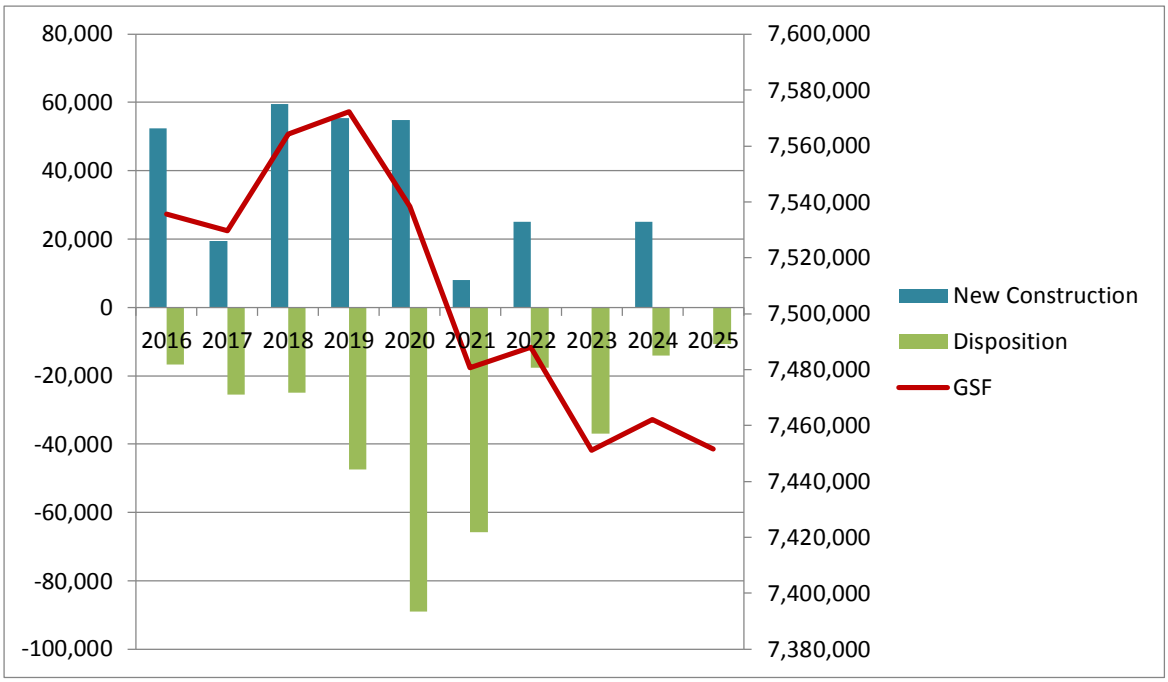


Chart Source: June 2016, SNL Footprint Tracking

Summary of Square Footage Increases and Decreases

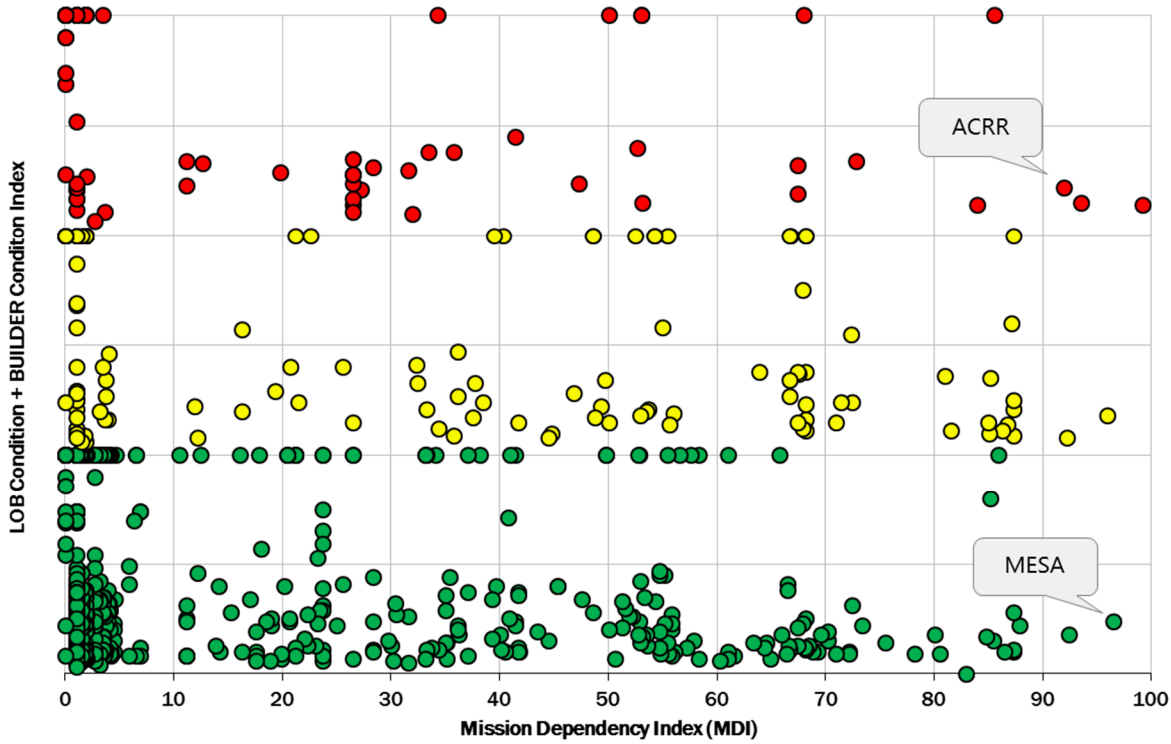
Square Footage Increases	**Square Footage Decreases**
FY16 – Buildings 756 and C926	TTR Clean-Up, 6530 Sheds
FY17 – Building C912 and an Employee Integration Center	KTF and CTF Clean-Up, TA-I Trailers (west of 756),
FY18 – the EOC, Building 895, TA-IV Chilled Water Loop, a Geo Sciences Complex, Corporate Space Optimization, 725 Addition	Redwood Center, Building 6592, TA-III Clean-Up
FY19 – TA-IV Z Support Building, New Generation Security Solutions Center, WEF, New Explosives Machining Facility, Corporate Space Optimization (Building 2), Battery Test Facility	Buildings 6580/6581 (transfer to EM), Buildings 803 and 6591
FY20 – LAZAP Facility, DSA Systems Mission Engineering Program (Building 1), TTR Mission Support Facility, replacement for Buildings 818 and 819	TA-I and TA-IV MO and Trailer Clean-Up
FY21 – Consolidated Waste Management Facility, Scalable Pulsed Accelerator and Reactor Center (SPARC), Applied Science Laboratory, Metrology and Calibration Laboratory	TA-I MO and Trailer Clean-Up
FY22 – DSA Information Systems Analysis	Buildings 03-55, 03-62, 03-65, 818, 819
FY23 – No new construction is planned at this time	Buildings 809, 952, 867
FY24 – DSA Systems Mission Engineering Program Facility (Building 2)	MO293, Buildings 853 and Accessory Buildings
FY25 – No new construction is planned at this time	Building 835

Note: Planned disposition projects are dependent on space consolidation solutions and new facilities

Chart source: June 2016, SNL Footprint Tracking. Consistent with June 2016 G2 Snapshot.

Major Gaps and Risks

MDI vs. Condition Scatter Chart



The list above corresponds to the buildings in the red box in the scatter chart and are areas of concern.

Asset #s	Project #s
858N	266, 282, 452, 476, 6492542, 2545, 2936
963	447, 463, 480, 3246
6588	120, 244, 1231, 2053, 2532
03-57	Newly Renovated
894	2066, 2540, 3411
Comm-NV	2060
801	507
842	TBD-SPP Funding
892	267, 298
864	TBD-SPP Funding
03-50	Disposition TBD
03-51	758
6591	TBD

They are also the buildings noted in the previous LOB Condition maps for TA-I.

Proposed Investment Plan

	FY17	FY18	FY19	FY20	FY21
Operations & Emergency Response Center NA-50 Line Item					
Nuclear Security Facility Efficiency					
Co-Location from Dispersed Operations					
Increase SCIF Space					
Central Utility Bldg Infrastruc					
General Site Infrastructure Maintenance and Enhancement					
NA-50 Disposition					
Power Source Replacement					
Building 725 Expansion					
Relocate Testers from 892					
Explosive Component Manufacturing					
Replace Aging Silicon Fab Capability					
Bldg 820 Closed Area					
Indirect Disposition					
Indirect Recapitalization					
Space Apt.					
Builder					
Major Building Reno					
B 892 Decon & Demo					

The table above represents the prioritized needs highlighted within the capability categories at the SNL